

REMARKS

The outstanding Examiner's Action objects to the drawings as failing to comply with 37 C.F.R. 1.84(p)(5) because they omit reference numeral 19. New formal drawings with reference numeral 19 are attached.

The disclosure is objected for including a number of informalities. The specification has been amended above to expressly address the issues raised on page 2 of the Examiner's Action. In addition, amendments have been made to page 27 of the specification to correct the spelling of the term "semi-permanently."

Claims 1-18 are pending in the application. By amendment above, applicant has amended Claim 10 to add a period at the end of the sentence. New Claims 19-21 have been added by amendment above.

New Claims 19-21 recite that the hinge of Claims 1, 9, and 13 includes a lubricant groove located in a region of the tapered inner surface of the frictional body that contacts the tapered peripheral surface of the rotation shaft. Support for new Claims 19-21 can be found in the specification at page 12, lines 5-6, and page 12, lines 17-21.

Before addressing the outstanding rejections based on 35 U.S.C. § 102(e) and 35 U.S.C. § 103, a brief review of the presently claimed invention may be helpful.

In the present invention, the tapered inner surface of the frictional resin body is tightly fastened to the tapered outer surface of the rotation metal shaft by a tightening tool. The tapered inner surface of the frictional resin body and the tapered outer surface of the rotation metal shaft are tightly wedged together in order to generate friction force between the tapered inner surface of the frictional resin body and the tapered outer surface of the rotation metal shaft. Lubrication between the tapered inner surface of the frictional resin body and the tapered outer surface of the rotation metal shaft is provided by a lubricant which is retained within the lubricant grooves located in the tapered inner surface of the frictional body. In prior designs, the pressure exerted

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by the tapered outer surface of the rotation metal shaft onto the tapered inner surface of the frictional resin body was capable of deforming the frictional resin body in a manner that either crushed or closed off the opening in the lubricant groove. Crushing or closing off the lubricant groove impeded the flow of lubricant to the interface between the inner surface of the frictional resin body and the outer surface of the rotation metal shaft.

The present invention solves this problem by providing a lubricant groove that is dimensioned to remain open when the tapered inner surface is deformed as the shaft exerts a pressing force on the tapered inner surface. Examples of transverse cross sections of lubricant grooves that are dimensioned to remain open even when the tapered inner surface is deformed as the shaft exerts a pressing force on the tapered inner surface include a V-shaped cross section, a cross section that has an opening width W that is greater than the depth H of the groove, or an opening wherein the angular edges of the opening are radiused.

Claims 1, 4, 5, and 13 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,381,808, to Kida. For the following reasons, applicant respectfully traverses this rejection.

Independent Claim 1, from which dependent Claims 4 and 5 depend, and independent Claim 13, as amended above, recite that the lubricant groove is dimensioned such that it remains open when the tapered inner surface is deformed as the shaft exerts a pressing force on the tapered inner surface. Kida does not disclose a hinge that includes a lubricant groove that is specifically dimensioned to remain open when a tapered inner surface is deformed as the shaft exerts a pressing force on the tapered inner surface. In fact, Kida is silent as to the cross-sectional shape of recesses 33a. In addition, Kida does not provide any recognition of the problem that the present invention addresses, i.e., crushing or closing off the lubricant groove when the tapered inner surface is deformed as the shaft exerts a pressing force on the tapered inner surface. Since Kida does not disclose each and every element of the claimed invention, it

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cannot anticipate it. Accordingly, the subject matter of Claims 1, 4, 5, and 13 is novel. Accordingly, the Examiner should withdraw the rejection.

Claims 2, 3, 6-8, and 14-18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kida in view of U.S. Patent No. 6,286,187, to Chang. For the following reasons, applicant respectfully traverses this rejection.

The Examiner's Action notes that Kida does not illustrate or describe cross-sectional shapes of the lubricant grooves that are substantially V-shaped or that the width of the grooves are greater than the height or depth of the grooves, or where the opening edges of the grooves are radiused. The Examiner's Action points out that Chang describes an oil groove 133 having a V-shape cross section, as best seen in FIGURE 2B. The Examiner's Action asserts that it would be obvious to modify the hinge of Kida to include the rotary hinge assembly as taught by Chang to provide and improve the lubricant hinge system for the purpose of retaining or pooling sufficient amounts of lubricant throughout the life of a hinge system.

In order for the subject matter of Claims 2, 3, 6-8, and 14-18 to be obvious, a *prima facie* case of obviousness must exist. A *prima facie* case of obviousness exists when there is some motivation or suggestion in the prior art to modify the teachings of a primary reference with the teachings of a secondary reference. For the following reasons, there is no motivation or suggestion in either Kida or Chang to modify the teaching of Kida to incorporate the rotary hinge assembly as taught by Chang. Kida is directed to an entirely different hinge design than Chang. Kida includes a lubricant groove that runs parallel to the axis of rotation of the hinge elements while Chang describes a lubricant groove that surrounds the axis of rotation as opposed to running parallel to the axis of rotation. Accordingly, Chang is not concerned with, and presumably would not suffer from the problem of failure of the edge portions of the lubricant groove in a manner that would result in closing of the lubricant groove.

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Even if there were some suggestion to modify Kida to include the hinge assembly of Chang, such combination does not render the invention of the rejected claims obvious for the following reasons. The rejected claims recite a frictional body having a tapered inner surface and a rotation shaft having a tapered peripheral surface. The rotary hinge assembly of Chang does not teach or suggest a tapered inner surface of a frictional body or a tapered peripheral surface of a rotation shaft. Accordingly, modifying the hinge of Kida to include the hinge of Chang does not result in applicant's invention as recited in the rejected claims. Accordingly, modifying the hinge of Kida to include the rotary hinge assembly as taught by Chang does not render the subject matter of Claims 2, 3, 6-8, and 14-18 obvious.

For the foregoing reasons, the subject matter of Claims 2, 3, 6-8, and 14-18 are non-obvious over Kida in view of Chang. Accordingly, the outstanding rejections should be withdrawn.

Claims 9-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kida. For the following reasons, applicant respectfully traverses this rejection.

Independent Claim 9 and Claims 10-12, which depend therefrom, recite a lubricant groove being dimensioned such that it remains open when the tapered inner surface is deformed as the shaft exerts a pressing force on the tapered inner surface. This is the same recital that is present in independent Claims 1 and 13, which were discussed above with respect to the outstanding rejection under 35 U.S.C. § 102(e) in view of Kida. Accordingly, the arguments set forth above are equally applicable to this outstanding rejection of Claims 9-12 in that Kida does not provide any suggestion or motivation for providing a lubricant groove being dimensioned such that it remains open when the tapered inner surface is deformed as the shaft exerts a pressing force on the tapered inner surface. In the absence of such teaching, Kida cannot anticipate or render obvious Claims 9-12. Accordingly, the outstanding rejection should be withdrawn.

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New Claims 19-21 have been added. These new claims recite that the at least one lubricant groove is located in a region of the tapered inner surface of the frictional body that contacts the tapered peripheral surface of the rotation shaft. Kida alone, or in combination with Chang, does not anticipate or render obvious the subject matter of new Claims 19-21.

For the foregoing reasons, the subject matter of Claims 1-18, as amended above, and new Claims 19-21 is novel and non-obvious over Kida alone or in view of Chang. Accordingly, the outstanding rejections should be withdrawn. If the reviewing party has any questions regarding the foregoing, he is invited to call applicant's attorney at the number listed below so that any outstanding issues can be resolved in a timely and efficient manner.

Respectfully submitted,

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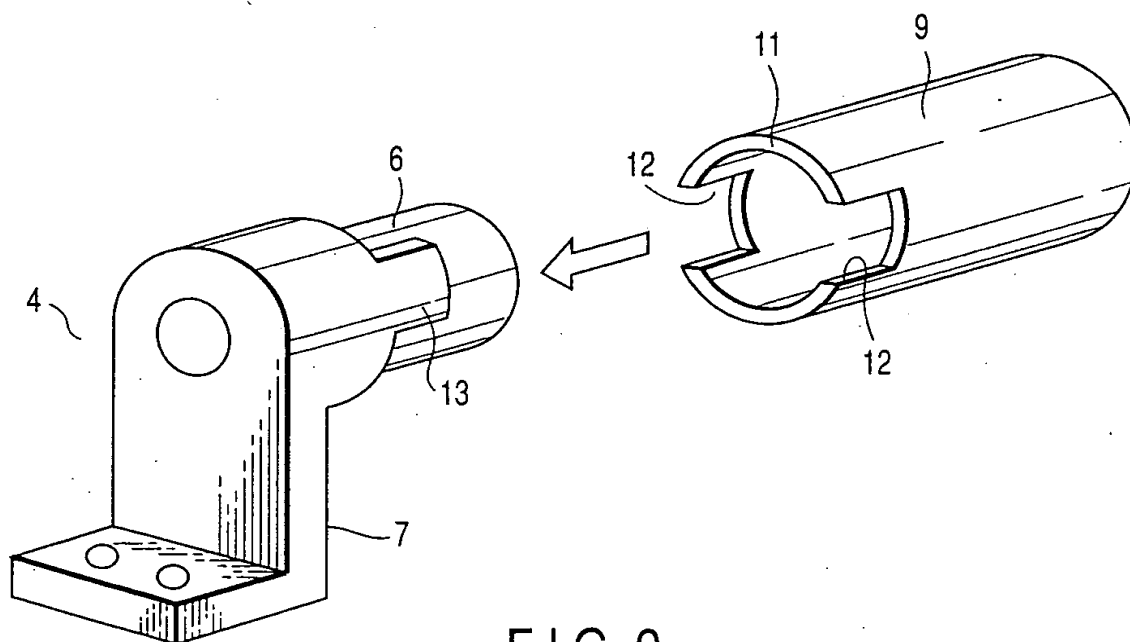
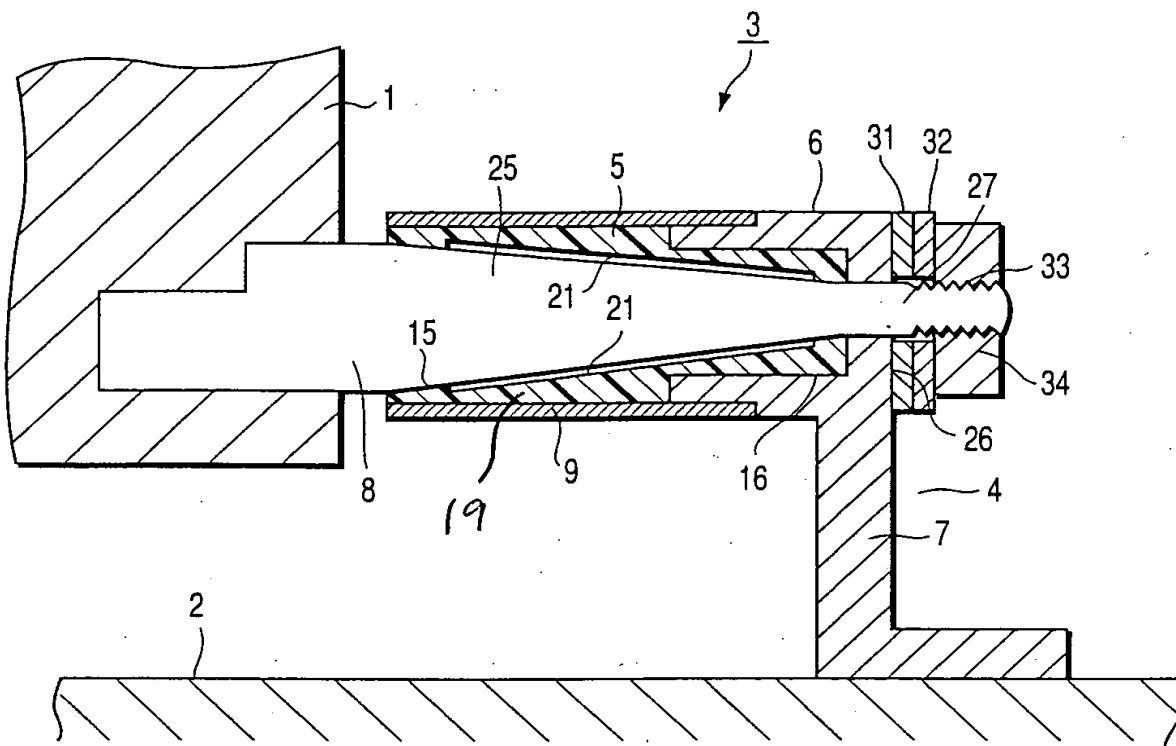
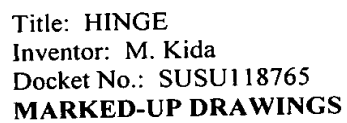
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Date: 11/26/03

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Title: HINGE
Inventor: M. Kida
Docket No.: SUSU118765
MARKED-UP DRAWINGS

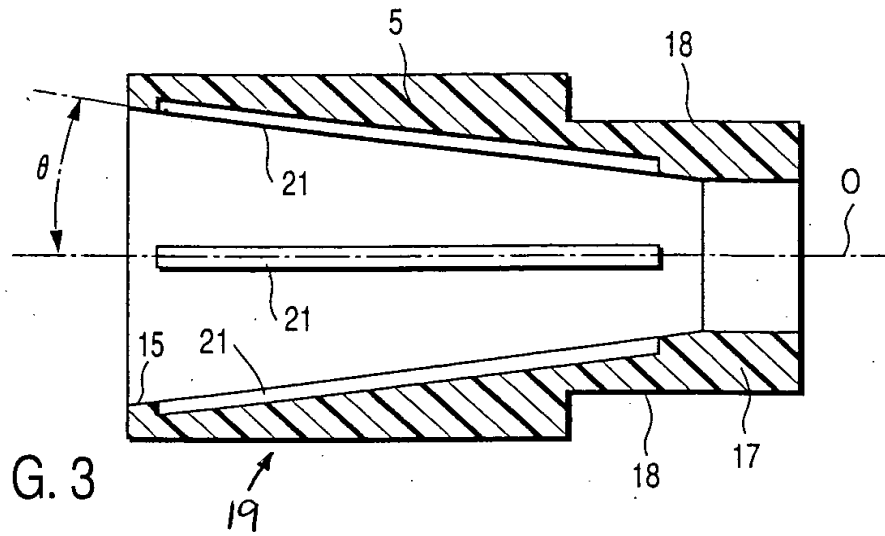


FIG. 3

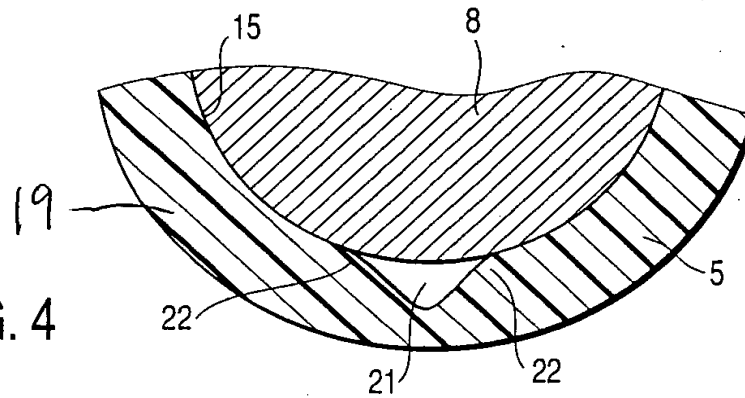


FIG. 4

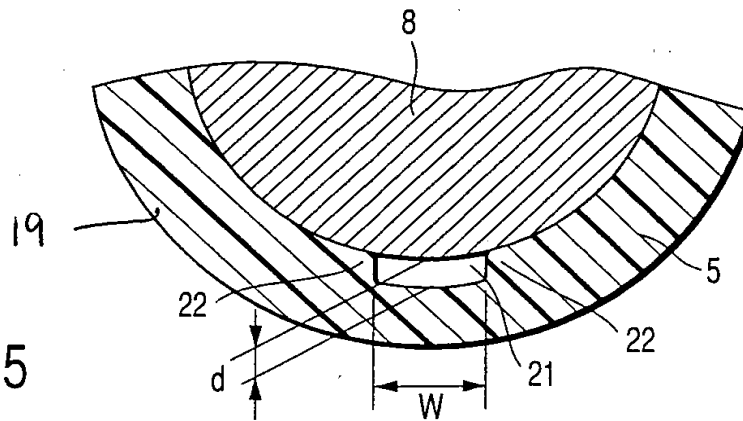


FIG. 5

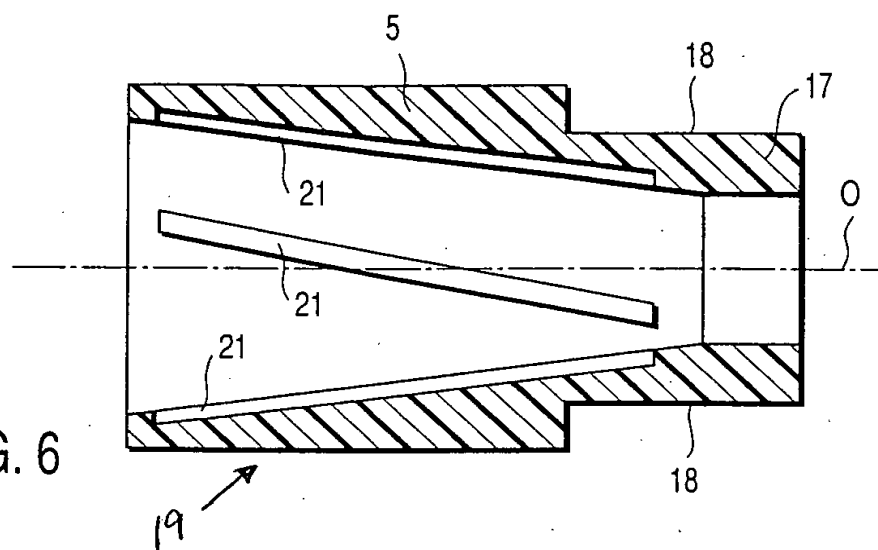
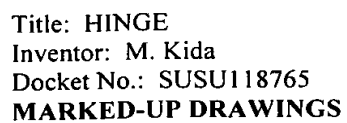


FIG. 6

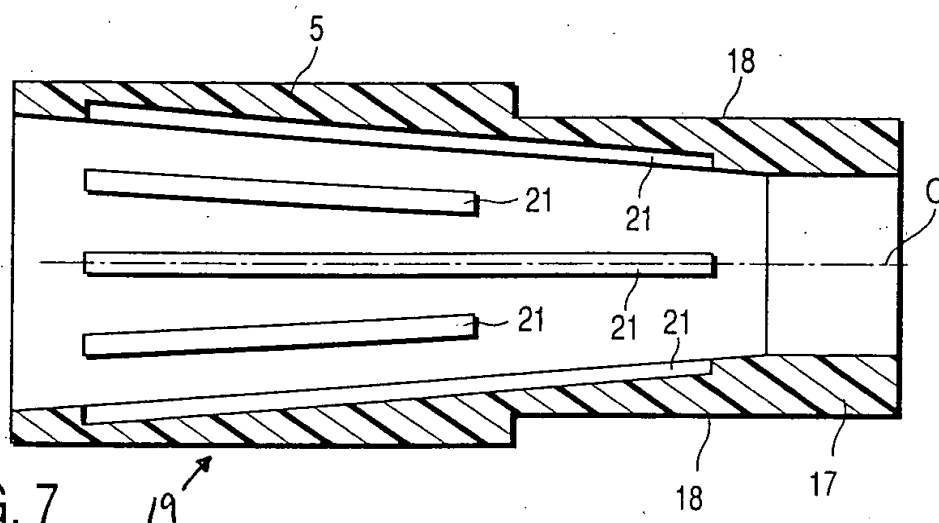


FIG. 7

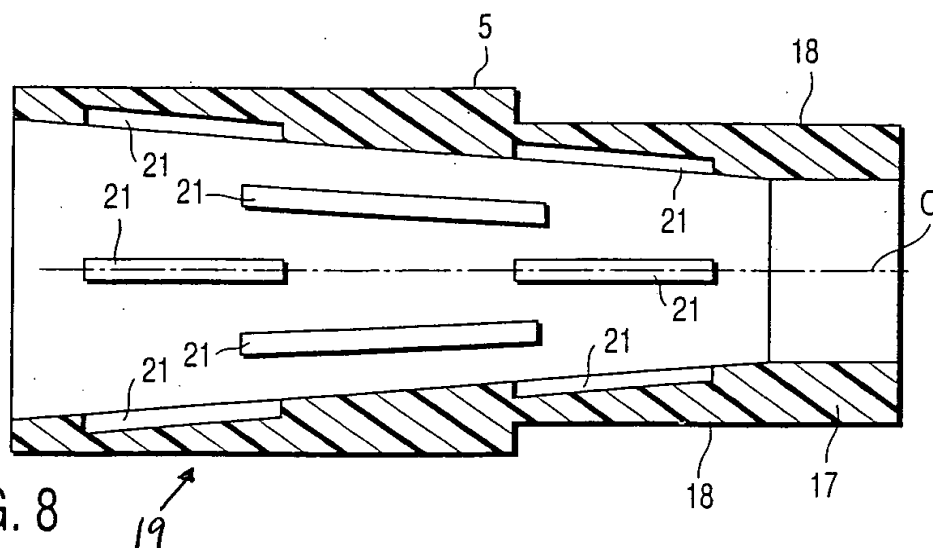


FIG. 8

